In the Claims

Please cancel Claims 9 and 17.

Please amend Claims 1, 2, 8, 10-12, 15, 16, and 18-32. Amendments to the claims are indicated in the attached "Marked Up Version of Amendments" (pages ii - ix).

1. (Twice Amended) A method for displaying a color image comprising the steps of:

illuminating a multilevel optical phase element with a light source having a plurality of wavelengths of interest, said multilevel phase element dispersing each wavelength of interest from said light source by diffraction into a plurality of diffraction orders and projecting the dispersed light onto an imaging plane; and actuating a light modulating display in the imaging plane having a plurality of pixel elements, each said pixel element assigned to transmit a predetermined spectral region, positioned within the near field region of said multilevel optical phase element so as to receive said dispersed and focused light from said multilevel optical phase element.

2. (Amended) The method of claim 1 wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relationship:

$$\frac{2T^2}{3\lambda_{long}} < Z < \frac{2T^2}{3\lambda_{short}}$$

wherein T is the periodicity of said multilevel optical phase element, λ_{Long} is the longest wavelength of said plurality of wavelengths of interest and λ_{Short} is the shortest wavelength of said plurality of wavelengths of interest.

8. (Amended) The method of claim 1 wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relationship:

$$\frac{T^2}{3\lambda_{long}} < Z < \frac{T^2}{3\lambda_{short}}$$

wherein T is the periodicity of said multilevel optical phase element, λ_{Long} is the longest wavelength of said plurality of wavelengths of interest and λ_{Short} is the shortest wavelength of said plurality of wavelengths of interest.

10. (Twice Amended) A method for displaying a color image comprising the steps of:

focusing light, from a light source having a plurality of wavelengths of interest, using a plurality of focusing elements;

illuminating a multilevel optical phase element with light focused by said plurality of focusing elements, said multilevel phase element dispersing each wavelength of interest from said plurality of focusing elements by diffraction into a plurality of diffraction orders and projecting the dispersed light onto an imaging plane; and

actuating a light modulating display in the imaging plane having a plurality of pixel elements, each said pixel element assigned to transmit a predetermined spectral region, so as to receive said dispersed light from said multilevel optical phase element.

11. (Twice Amended) The method of claim 10 wherein said plurality of focusing elements includes a plurality of lenslets and wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relationship:

$$\frac{2T^2Z_s}{3\lambda_{long}Z_s-2T^2} < Z < \frac{2T^2Z_s}{3\lambda_{short}Z_s-2T^2}$$

wherein T is the periodicity of said multilevel optical phase element, Z_s is equal to the distance between said multilevel optical phase element and said lenslets minus the focal length of said lenslets.

12. (Twice Amended) The method of claim 10, wherein said plurality of focusing elements includes a plurality of lenslets and wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relationship:

$$\frac{T^2 Z_s}{3\lambda_{long} Z_s - T^2} < Z < \frac{T^2 Z_s}{3\lambda_{short} Z_s - T^2}$$

wherein T is the periodicity of said multilevel optical phase element, Z_s is equal to the distance between said multilevel optical phase element and said lenslets minus the focal length of said lenslets.

15. (Twice Amended) A apparatus for displaying a color image comprising:

a light source emitting a plurality of wavelengths of interest;

a multilevel optical phase element positioned to receive light from said light source, said multilevel phase element dispersing each wavelength of interest from said light source by diffraction into a plurality of diffraction orders and projecting the dispersed light onto an imaging plane; and

a light modulating electronic display positioned in the imaging plane and having a plurality of pixel elements, each said pixel element assigned to transmit a predetermined spectral region, positioned within the near field region of said multilevel optical phase element so as to receive said dispersed light from said multilevel phase element.

16. (Twice Amended) The system of claim 15 wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relationship:

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$$\frac{2T^2}{3\lambda_{long}} < Z < \frac{2T^2}{3\lambda_{short}}$$

wherein T is the periodicity of said multilevel optical phase element, λ_{Long} is the longest wavelength of said plurality of wavelengths of interest and λ_{Short} is the shortest wavelength of said plurality of wavelengths of interest.

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18. (Twice Amended) The apparatus of claim 15 wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relation:

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$$\frac{T^2}{3\lambda_{long}} < Z < \frac{T^2}{3\lambda_{short}}$$

wherein T is the periodicity of said multilevel optical phase element, λ_{Long} is the longest wavelength of said plurality of wavelengths of interest and λ_{Short} is the shortest wavelength of said plurality of wavelengths of interest.

19. (Twice Amended) The apparatus of claim 16 wherein said light source has a polychromatic spectrum.

20. (Twice Amended) The apparatus of claim 15 wherein said light source comprises a plurality of subsources each subsource having a different spectral distribution.

21. (Twice Amended) The apparatus of claim 20 wherein each said subsource is a light emitting diode.

22. (Twice Amended) The apparatus of claim 20 wherein each said subsource is a laser.

23. (Twice Amended) The apparatus of claim 15 wherein said multilevel optical phase element is multilevel in two orthogonal directions.

24. (Twice Amended) A apparatus for displaying a color image comprising:

a light source having a plurality of wavelengths of interest;

a plurality of focusing elements positioned to focus light from said light source;

a multilevel optical phase element positioned to receive light focused by said plurality of focusing elements, said multilevel phase element dispersing each wavelength of interest from said plurality of focusing elements by diffraction into a plurality of diffraction orders and projecting the dispersed light onto an imaging plane; and

a light modulating electronic display positioned in the imaging plane and having a plurality of pixel elements, each said pixel element assigned to transmit a predetermined spectral region, positioned so as to receive said dispersed light from said multilevel optical phase element.

25. (Twice Amended) The apparatus of claim 24 wherein said plurality of focusing elements comprises a plurality of lenslets and wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relationship:

$$\frac{2T^2Z_s}{3\lambda_{long}Z_s-2T^2} < Z < \frac{2T^2Z_s}{3\lambda_{short}Z_s-2T^2}$$

wherein T is the periodicity of said multilevel optical phase element, Z_s is equal to the distance between said multilevel optical phase element and said lenslets minus the focal length of said lenslets, λ_{long} is the largest wavelength of said plurality of wavelengths of interest and λ_{short} is the shortest wavelength of said plurality of wavelengths of interest.

26. (Twice Amended) The apparatus of claim 24 wherein said plurality of focusing elements comprises a plurality of lenslets and wherein said display is positioned at a distance Z from said multilevel optical phase element, wherein Z is determined by the relationship:

$$\frac{T^2 Z_s}{3\lambda_{long} Z_s - T^2} < Z < \frac{T^2 Z_s}{3\lambda_{short} Z_s - T^2}$$

wherein T is the periodicity of said multilevel optical phase element, Z_s is equal to the distance between said multilevel optical phase element and said lenslets minus the focal length of said lenslets, λ_{long} is the largest wavelength of said plurality of wavelengths of interest and λ_{short} is the shortest wavelength of said plurality of wavelengths of interest.

27. (Twice Amended) The apparatus of claim 24 wherein said multilevel optical phase element is constructed such that a magnification produced by said plurality of lenslets produces a dispersion element substantially equal to the dimensions of each pixel element in said display.

28. (Twice Amended) The apparatus of claim 27 wherein said magnification (M) is given by the equation:

$$M = 1 + \frac{Z}{Z_s}$$

wherein T is the periodicity of said multilevel optical phase element, Z is the distance between said multilevel optical phase element and said display and Z_s is equal to the distance between said multilevel optical phase element and said lenslets minus the focal length of said lenslets.